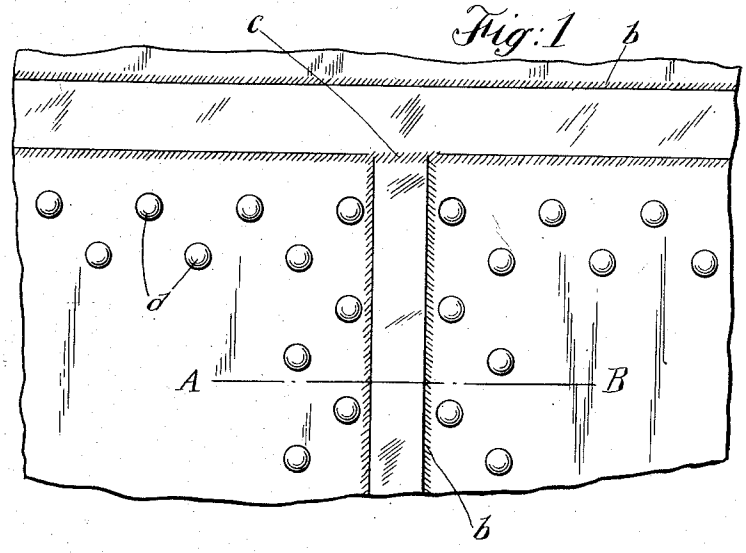
W. L. COLE.

METAL PLATE STRUCTURE.

APPLICATION FILED MAY 28, 1918.

1,370,288. Patented Mar. 1, 1921.

Fig: 1



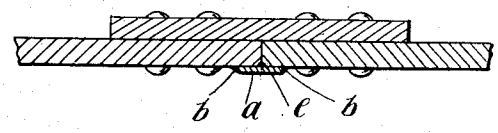


Fig: 2.

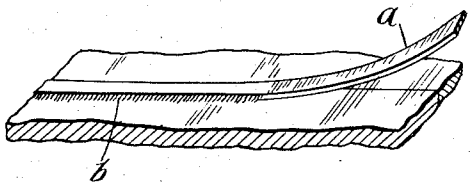


Fig: 3.

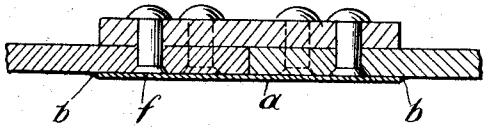


Fig: 4.

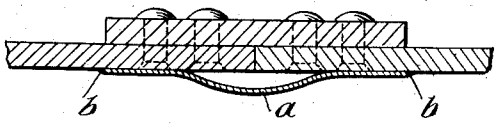


Fig: 5.

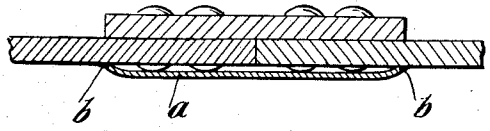


Fig: 6.

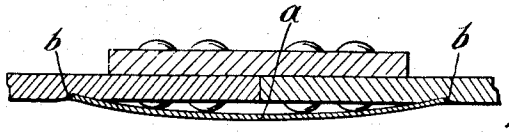


Fig: 7.

INVENTOR

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BY

Kenyon & Kenyon,

His ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM LAWES COLE, OF MILE END, EAST LONDON, ENGLAND, ASSIGNOR TO QUASI-ARC COMPANY, LIMITED, OF LONDON, ENGLAND.

METAL PLATE STRUCTURE.

1,370,288. Specification of Letters Patent. Patented Mar. 1, 1921.

Application filed May 28, 1918. Serial No. 237,136.

To all whom it may concern:

Be it known that I, WILLIAM LAWES COLE, a subject of the King of England, and residing at #23 Clinton road, Mile End, East London, England, have invented certain new and useful Improvements in Metal Plate Structures, of which the following is a specification.

This invention relates to metal plate structures of ships, tanks and the like, which are required to be water-tight. In structures of this character which are liable to be subjected to heavy stresses, no calking can be permanently effective, and it is liable to break down very quickly in structures such as plated vessels after heavy gun firing. What is required in order to render such a structure water-tight, is to provide some form of elastic sealing medium which will cover all of the joints, and will not be destroyed by the maximum strains and deformations to which the plating structure is liable.

As far as I am aware, however, there is no satisfactory elastic medium of a non-metallic nature which could be used, or which has been successfully applied to the purpose in view, and it is the object of this invention to attain the result with a metallic structure, preferably using methods of welding for securing the protecting sheets.

According to the present invention, comparatively thin and flexible metal sheets are used which will cover over the joint lines, the sheets being welded to the plating in order to eliminate all risk of leakage. In preparing sheets for the purpose rolled steel plates may be used of a comparatively thin gage, for example No. 12 gage and these sheets are annealed throughout in order that their consistency may be as uniform as possible after welding. They are laid over the joint lines and are fillet-welded at their edges to the plates at each side of the joints.

The invention is illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 shows in face view, and

Fig. 2 in cross section on the line A—B of Fig. 1, a form of joint to which the invention is applied.

Fig. 3 is a detail view.

Figs. 4 to 7 are sectional views illustrating various further methods of carrying the invention into effect.

Figs. 1 and 2 show riveted plating with comparatively narrow steel strips *a* laid over the joint lines and welded at each side to the plates by means of deposited fillet welds at *b*. Where one strip meets another over a plate joint, the end of the abutting strip is welded to the edge of the outer strip or to the plating as at *c*, Fig. 1. In this example, the applied strips *a* may be only say from 1 to 2 inches broad so that they will lie inside the lines of rivets *d*, as shown. The steel strips *a* can be fed down against the surface of the plating as they are being welded, in the manner illustrated in Fig. 3, the ends of successive strips being united by welding where more than one length of strip is required for a joint line. The resultant structure is absolutely water-tight and will withstand very high stresses without showing any signs of leakage. In fact the welded strips actually reinforce the joints and increase their resistance to opening stresses to an appreciable extent, while with stresses large enough to open the joints somewhat, the thin annealed steel strips can extend or bend transversely to the extent required without their welded edges breaking away.

Even with no calking between the edges of the plates of the structure, therefore, it is a great improvement on existing plating structures as regards resistance to opening up of the joints and risk of leakage. The actual joint line may also be calked, for example as at *e* Fig. 2, before the steel strip is applied with a run of deposited welding metal whenever this is considered desirable, and this will further strengthen the joint and increase its resistance to opening stresses. Mechanical calking can also be used.

The thin covering plates may be applied so as to extend over the rivet heads if desired, which then renders unnecessary or of less importance, the calking of the rivets. Fig. 4 shows in section a flat steel strip *a* which is wide enough to cover the rivet heads, applicable to cases in which the heads *f* of the rivets are flush in countersunk holes at the exposed side of the plating.

The applied strips *a* need not necessarily lie flat against the plating, but they may be buckled outwardly somewhat from it in order to allow freedom of expansion, or slightly waved or corrugated in a direction

extending along the joint line. This is illustrated in Fig. 5. If the rivet heads project, as in Fig. 6, the steel strips may be bent inwardly at their edges beyond the rivet lines and welded there. This also provides an element of flexibility in the middle part of the strip which is held out at a little distance from the surface of the plating.

The edges of the covering strips may also be let into recesses in the metal plating if desired, as indicated in Fig. 7, but as a rule this should not be necessary as the fillet welds *b* at the edges will prevent any sharp corners being left.

In any such cases as those of Figs. 5, 6 and 7, wherein the strips are curved and extend away from the plating surface over part of their width, the ends of the strips may either be flattened down to enable them to be welded to the plating or to crossing strips, or such crossing strips may have their edges lifted to apply them to the ends of the first mentioned strips, whichever may be most convenient.

Any suitable welding process may be employed for depositing the fillets of welding metal, and for welding as at *e*, Fig. 2, to replace mechanical calking, but a welding process, using electrodes of the kind set forth for example, in the specification of British Patent No. 13,538 of 1914, is considered the best for the purpose. In the process wherein such electrodes are used, the said electrodes are covered with a flux-forming covering, and are held with their ends close down to the work, so that it is a spluttering or quasi-arc which passes.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of rendering joints fluid-tight when subjected to fluid under pressure which consists in applying a flexible strip over the joint and welding the edges of the strip on either side of the joint.

2. The method of preventing leakage of fluid under pressure between two members relatively movable under varying stresses which consists in welding one edge of a strip to one of the members and welding the other edge of the strip to the other member on the other side of the joint so that the body portion of the strip will take up the relative movement between the members and each edge will remain fixed with respect to the member to which it is attached.

3. The method of rendering joints water-tight when subjected to fluid under pressure which consists in lapping the joint with a strip and fillet welding the edges of the strip to the joined members one on each side of the joint.

4. A composite metal structure comprising two members with a joint between them, and a relatively thin expansible member lapping the joint and having one edge fillet welded to each of said members in a manner to exclude fluid under pressure.

5. A composite metal structure comprising two members relatively movable with a joint between them and a strip covering the joint and having its edges fillet welded to the members and its body portion adapted to take up the relative movement between said members.

6. A composite metal structure comprising two members with a joint between them and a metal strip covering the joint and having both edges fillet welded to the said members.

7. A composite metal structure comprising two members with a joint between them, a heavy strip lapping the joint on one side and riveted to said members and a relatively thin strip lapping said joint on the other side having its edges welded to said members outside said rivets thereby rendering said joint water-tight as against water under pressure.

In testimony whereof I have signed my name to this specification.

WILLIAM LAWES COLE.